Application No. 10/788,657
Amendment dated May 21, 2008
Response to Final Office Action of February 20, 2008

Atty. Docket No. 42P16330X
Examiner MURPHY, Rhonda L.
TC/A.U. 2616

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-29.   (Canceled)

30.   (New) A method comprising:

receiving content for transmission from a plurality of transmit antennae, wherein the received content is a vector of input symbols (**s**) of size Nc x 1, wherein Nc is the number of subcarriers of the multicarrier wireless communication channel; and

generating a rate-one, space-frequency code matrix from the received content for transmission via the plurality of transmit antennae by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of NG subcarrier spacings.

31.   (New) A method according to claim 30, further comprising:

dividing each of the pre-coded vectors into a number of LM x 1 subvectors; and

creating an M x M diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g, \cdots, \Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1...L$ from the subvectors.

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32.   (New) A method according to claim 31, further comprising:

interleaving the L submatrices from the G groups to generate an M x Nc space-frequency matrix.

33.   (New) A method according to claim 32, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.

34.   (New) A method according to claim 30, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.

35.   (New) An apparatus comprising:

a diversity agent to receive content for transmission via a multicarrier wireless communication channel, wherein the received content is a vector of input symbols (**s**) of size Nc x 1, wherein Nc is the number of subcarriers of the multicarrier wireless communication channel, and to generate a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from a plurality of transmit antennae by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded

vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of NG subcarrier spacings.

36.   (New) An apparatus according to claim 35, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of LM x 1 subvectors, and to create an M x M diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g, \cdots, \Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1...L$ from the subvectors.

37.   (New) An apparatus according to claim 36, wherein the space-frequency encoding element interleaves the L submatrices from the G groups to generate an M x Nc space-frequency matrix.

38.   (New) An apparatus according to claim 37, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.

39.   (New) An apparatus according to claim 35, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.

40.   (New) A system comprising:

a number M of omnidirectional antennas; and

a diversity agent, to receive content for transmission via a multicarrier wireless communication channel, wherein the received content is a vector of input symbols (**s**) of size Nc x 1, wherein Nc is the number of subcarriers of the multicarrier wireless communication channel, and to generate a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from at least a subset of the M omnidirectional antennas by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of NG subcarrier spacings.

41.   (New) A system according to claim 40, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of LM x 1 subvectors, and to create an M x M diagonal matrix $D_{\mathbf{s}_g,k} = diag\{\Theta^T_{M\times(k-1)+1}\mathbf{s}_g,\cdots,\Theta^T_{M\times k}\mathbf{s}_g\}$, where $k=1...L$ from the subvectors.

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42.   (New) A system according to claim 41, wherein the space-frequency encoding element interleaves the L submatrices from the G groups to generate an M x Nc space-frequency matrix.

43.   (New) A system according to claim 42, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.

44.   (New) A system according to claim 40, wherein the space-frequency matrix provides $M\,N\,L$ channel diversity, while preserving a code rate of 1 for any number of transmit antenna(s) M, receive antenna(s) N and channel tap(s) L.